

## Table of Contents

Table of Contents.....	1
Foreword.....	3
Vision Dixie Growth Principles (and relative importance to Critical Lands) .....	3
Planning for Growth and Land Preservation.....	5
Washington County Overview.....	7
SECTION 1. Natural History Overview .....	9
1.1 - Geology.....	9
1.2 - Faulting, Landslides, and Rock Falls.....	10
1.3 - Water Courses .....	12
1.4 Flooding.....	13
1.5 - Vegetation - Plant Communities.....	14
Plant Communities and Wildfire Risk .....	18
Riparian Water Loss from Invasive Species.....	20
Tamarisk (Saltcedar) .....	20
Russian Olive .....	22
1.6 – Public Lands.....	23
Dixie National Forest .....	23
The Bureau of Land Management - BLM .....	23
National Park Service (Zion National Park) .....	25
SITLA .....	25
Section 2. Critical Lands Defined .....	27
Category 1. Public Health and Safety .....	28
Geological Hazards .....	28
Flooding and Erosion .....	32
Fire Hazard Risk.....	34
Threatened and Endangered Species.....	35
ESA Critical Habitat and Conservation Provisions:.....	35
Habitat Conservation Plans .....	36
Washington County Endangered Species.....	37
Desert Tortoise.....	37
Mexican Spotted Owl .....	38
Southwestern Willow Flycatcher.....	39
Yellow-Billed Cuckoo.....	40
Woundfin, and Virgin River Chub .....	40
Shivwits milkvetch ( <i>Astragalus ampullarioides</i> ), .....	42
Holmgren milkvetch ( <i>Astragalus holmgreniorum</i> ).....	42
Dwarf Bear Claw Poppy ( <i>Arctomecon humilis</i> ).....	43
Siler pincushion cactus ( <i>Pediocactus sileri</i> ) .....	43



3a. Critical Habitat for Large Ungulate Species.....	44
Section 3: Vision Dixie – Public Involvement Supporting Critical Lands Preservation.....	45
Section 4: Implementation Tools and Techniques .....	49
Section 4.1 - Strategic Development Codes to Preserve Corridors and Open Space .....	50
Planned Unit Development Agreement: .....	51
Cluster Development:.....	51
Securing Open Space Maintenance and Protection.....	52
Private HOA and Public Development Agreements .....	53
Public Enforcement Rights .....	53
Transfer of Development Rights (TDR):.....	55
River Buffer or Setback (Applied to Commercial, Multi-family, or Mixed Use Development: .....	56

## Foreword

Washington County recently completed an extensive public input process that encouraged stakeholders and residents to consider future growth options for land development, transportation, and land preservation. The process, called Vision Dixie, explored growth scenarios that were evaluated by the public, and later distilled into a preferred growth scenario, called the 'Dixie Vision.' The Dixie Vision includes a county-wide vision map, a set of supporting growth principles, and a series of implementation guidelines that serve as a common reference point for voluntary and cooperative implementation efforts by local governments in the county.

This critical lands resource guide has been developed to help communities in Washington County better understand critical lands as they shape future development and consider new growth management strategies.

The term 'critical lands' is used to describe three general landscape conditions; 1) land areas containing natural constraints that could jeopardize the life, safety, and welfare of citizens (such as flood plains or unstable slopes), 2) land areas that play a critical role in protecting water resources (such as river banks or ground-water recharge areas), and 3) land areas that are critical for the survival of certain animal and plant species. The term 'sensitive lands' is also used throughout the guide to describe land that could be critical for one of the stated conditions above, or that contributes significantly to the regional welfare or quality of life in its present undeveloped state (such as scenic vistas or agricultural lands).

The content of this report and accompanying online mapping utility can be used to support the Dixie Vision growth principles as summarized in the following list. The growth principles are more completely described in the Dixie Vision final report. The descriptions following each listed principle below emphasize how the growth principles directly encourage critical lands management, or suggest how critical lands conservation relates to a seemingly unrelated growth principle:

### ***Vision Dixie Growth Principles (and relative importance to Critical Lands)***

#### **1. Plan Regionally, Implement Locally**

This toolkit provides a county-wide resource that can be used as a reference by all communities for general plan updates, annexation petition reviews, and as a guide to manage developer master plan proposals and detailed site plans.

#### **2. Maintain Air and Water Quality and Conserve Water**

More efficient growth patterns can promote multiple benefits, including shorter driving distances and reduced travel (and less air pollution), smaller lawns and less water use, and less development expansion that extends into sensitive areas.



**3. “Guard Our ‘Signature’ Scenic Landscapes (by protecting unique physical features and preserving our agricultural heritage)."**

Each community in Washington County has a unique set of growth challenges and opportunities in a region that is both geologically and biologically diverse. This toolkit provides background information on the multiple physiographic land features that define Dixie's beauty, and that may pose real safety threats to expanding growth. Also featured in the online mapping utility are agricultural lands that are still productive and could be used for agricultural purposes in the future.

**4. Provide Rich, Connected Natural Recreation and Open Space**

Connected open space would support recreation demands by creating continuous recreational and scenic beauty between neighborhoods, and public land areas. Connected open space can also benefit wildlife by creating travel corridors from one habitat area to another. Care should be taken to not overwhelm some habitat corridors with recreational access, such that over-use does not disrupt sensitive lands that support wildlife.

**5. Build Balanced Transportation that includes a System of Public Transportation, Connected Roads, and Meaningful Opportunities to Bike and Walk.**

Meaningful opportunities to bike and walk could include safe walking or biking routes from neighborhoods to trails and natural open space areas. This would encourage walking, cycling, or transit trips to trail heads and recreational open space areas rather than vehicle trips.

**6. Get ‘Centered’ by Focusing Growth on Walkable, Mixed-Use Centers**

The development of mixed use centers provides many benefits, including less land built and water used per home or business. A concentration of growth activity in one mixed use center can encourage growth away from surrounding sensitive lands – particularly if development rights are clustered or transferred from sensitive areas into the center.

**7. Direct Growth Inward – focus inward first, contiguously second, and discourage leap-frog development.**

Encouraging an efficient growth pattern can reduce pressure on surrounding sensitive lands and increase opportunities to explore options for preserving critical lands.

**8. Provide a Broad Range of Housing Types to Meet the Needs of All Income Levels, Family Types, and Stages of Life.**

A variety of housing types can be created through techniques such as cluster development or transfer of development rights. These ordinances would allow a developer to increase density if open space or critical lands are preserved from development (See Section 5).

**9. Reserve Key Areas for Industry to Grow the Economic Pie**

Communities can reference this toolkit to avoid planning employment areas where new growth would negatively impact critical lands, or where new growth would be threatened by critical land hazards.

**10. Focused Public land Conversion Should Sustain Community Goals and Preserve Critical Lands**



- Washington County residents value public lands for scenic, recreational and environmental values and want any conversion to be done with care.
  - Public lands should only be considered for conversion to development in logical contiguous extensions of communities.
  - Explore preservation of critical state and private lands through voluntary exchanges for public land more suitable for development.
- 

These growth principles from the Dixie Vision provide an important glimpse of how future growth and development needs can be met while consuming less land, water, and infrastructure investment – and while preserving critical lands. Although attractive and inspiring, many natural features pose the risk of hazards that destroy property, life, and livelihood. Additionally, without additional forethought and coordinated effort, the region's desirability may be undermined without efforts to preserve strategic lands to compliment growth with enhanced views or recreational access to public lands.

Also, some of the region's rich biodiversity has been negatively impacted by a variety of human activities and development, with nine species of plants and animals now federally listed as threatened or endangered, and one animal petitioned as a candidate. These issues point to the need to better understand the unique landscape characteristics in Washington County, and consider growth management strategies that continue conservation efforts in the face of rapid growth.

## ***Planning for Growth and Land Preservation***

This resource guide and supplemental digital mapping provide background information and descriptions of sensitive land characteristics and locations that could threaten the life, health, and safety of the public if developed, and that might be considered for preservation as an amenity to expanding urbanization. Efforts to guide development away from these sensitive areas could benefit humans as well as the wildlife species that rely on the local ecosystem.

In addition to supporting the Vision Dixie Growth Principles, the purposes of creating and adopting this summary of critical lands include the following:

1. To educate the public, including land owners, citizens, developers, elected officials, and local government staff of potential risks and opportunities associated with critical lands (Section 1).
2. To identify and define critical lands that should be further studied, and possibly preserved or regulated to protect public life, health, safety, and to enhance public welfare as urban growth expands community footprints into surrounding landscapes.



3. To provide a reference that informs growth policies, development reviews, land preservation efforts, and water conservation projects.
4. To provide a common reference point for county-wide use, and to efficiently develop useful data and information relating to critical lands without duplicating services between jurisdictions.
5. To provide background information for greater insight and understanding of the critical lands mapping data.
6. To encourage implementation of the Vision Dixie process that documents public support for open space and critical lands by showing where public desires for open space correspond with critical lands areas.
7. To provide descriptions of underutilized conservation planning tools, and creative development ordinances that could support implementation of Vision Dixie principles



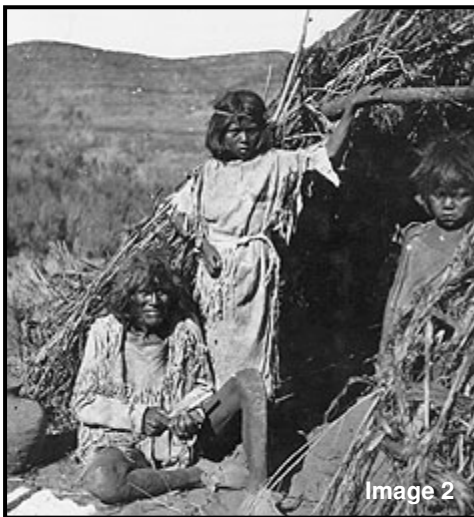
## Washington County Overview

Washington County provides a unique setting enjoyed by residents that call the area home, and tourists that are drawn to visit and recreate. Plateaus and cliffs are colored with layers of orange, red and tan rock formations, and high forested mountains provide water, recreation and beautiful scenery to communities throughout the region. The Virgin River and its tributaries have cut and polished canyon walls through sandstone and volcanic rock mountains, creating lush riparian corridors with abundant plants, fish, birds, and other wildlife. Washington County is where three ecosystems converge: the Mojave Desert, the Great Basin, and the Colorado Plateau. This phenomenon - coupled with a dramatic elevation difference of more than 8,000 feet, creates a unique and abundant variety of plants and animals, including plants and fish that cannot be found anywhere else in the world. This scenery, coupled with a warm year-round climate and low humidity attracts many to visit – and even stay to live in this unique setting.



Washington County has a rich cultural history that shows past reliance on limited water resources and a fragile regional landscape. The pioneer spirit and the settlement of St. George by LDS missionaries in 1861 is much celebrated today; however, archaeological sites in and around Washington County reflect thousands of years of inhabitation. Both the Virgin and Santa Clara Rivers provided an important base for the establishment of year-round Anasazi and Parawon Fremont villages. These early predecessors of the Paiute Indians had disappeared from the archaeological record by A.D. 1300. Theories of their disappearance include extended drought, catastrophic flooding, or and

inability to compete with nomadic cultures such as the Southern Paiute, who had entered the region by A.D. 1100.<sup>1</sup>



“Of all those now living in Washington County none have existed there as long as the Shivwits band of Paiutes.”<sup>2</sup> The Paiute people were once a hunting and gathering culture. However, they also irrigated fields along the banks of the Virgin, Santa Clara, and Muddy Rivers. Although the Paiutes encountered European parties in the late 1700’s and early 1800’s; most notably the Escalante-Dominguez party and Jedediah Smith, the arrival of permanent Mormon settlements in the 1850s and ensuing federal establishment of Indian reservations ended the Paiutes traditional lifestyle.<sup>2</sup> The first Paiute reservation effort began in 1891 on the Santa Clara River west of St. George, and was formally established in 1903. Indians were removed from northern Arizona to

the Utah Reservation at the request of Mayor Anthony Ivins who ran cattle in the “Arizona Strip” country, and sought a solution to deal with hungry Paiutes that were stealing from his cattle herds in the Mt. Trumbull area. Although Ivins purchased land and farming equipment for the Indians with a \$40,000 congressional appropriation, the reservation was too small with limited resources to sustain the Shivwitz band. This required Mormon Church charity and federal government subsidies to support the Paiutes. In 1916 President Woodrow Wilson issued an executive order which expanded the size of the reservation to its current 26,880 acres<sup>4</sup>, yet scarce water rights only allowed cultivation of 83 acres.<sup>5</sup>



Directed by Brigham Young, Mormon pioneers began settling in Washington County as early as 1852. However, it wasn't until 1861, when several hundred families were called to colonize the region, that St. George was settled, becoming the center of the region.<sup>3</sup> Life was not easy for early pioneers, as climate and desert conditions made it difficult to raise crops, and flash floods were a continual threat. Mormon settlements took place on traditional

Paiute foraging and camping areas, which led to starvation and disease that drastically reduced the Paiute population and led to conflicts between the two cultures.<sup>4</sup>

Settlers were eventually able to produce sizable amounts of cotton, grapes, and molasses, and other subtropical products. Some had previous experience raising cotton in the southeast before migrating to the Rocky Mountains – which led to the successful small scale production of cotton in the region, and to the nick name “Dixie” for the area.<sup>6</sup>

### **Present Day Growth Challenges**

Since 2000, growth in Washington County has added an average of about 6,000 new residents each year<sup>7</sup> and is estimated to have converted 4,500 acres, or just over one square mile of land to development each year.<sup>8</sup> As new development continues to expand the footprint of communities in the Dixie region, new homes, businesses, and infrastructure will reach into the surrounding beauty – and potentially into harms way. Although attractive and inspiring, many natural features pose hazards that may destroy property, life, and livelihood. Additionally, without continued forethought and coordinated effort, the region's desirability may be undermined without efforts to preserve strategic lands to complement growth with enhanced views or recreational access to public lands.

Also, some of the region's rich biodiversity has been negatively impacted from a variety of human activity and development, with nine species of plants and animals being federally listed as threatened and endangered. Local government planning can build upon past conservation partnerships of federal, state, and local governments, land owners and other key stake holders. This report provides a broad overview of past critical land planning efforts, including references to relevant projects and studies. It also identifies growth related challenges that require continued multi-jurisdictional efforts.